

**REMARKS**

Claims 1-21 are currently pending in the application. By this amendment, claims 1, 6, 11, 13, 15, 16 and 18 are amended for the Examiner's consideration. Support for the amendment(s) is provided in at least Figure 1 and at page(s) 8 and 9 of the specification. No new matter is added. Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

***Allowed Claims***

Applicants appreciate the indication that claims 11, 12, and 15-20 contain allowable subject matter. Applicants further appreciate the indication that claim 21 is allowed.

Applicants have amended claims 12, 15 and 18 to include the respective subject matter of the base claims and any intervening claims. These claims are now in immediate condition for allowance. Applicants, though, submit that the remaining claims are in condition for allowance for the following reasons.

***35 U.S.C. §102 Rejection***

Claims 1-10 were rejected under 35 U.S.C. §102(b) for being anticipated by U. S. Patent No. 6,253,736 to Crofts. This rejection is respectfully traversed.

Claim 1 recites,

A control for an injector, comprising an energizing device actuated by a fluid pressure acting on a feedback piston during an injection event to provide a monitoring voltage.

However, these features are not taught by Crofts. Accordingly, claims 1-10 are distinguishable over Crofts and should pass to issuance.

Referring to Figure 1 of Crofts, the fuel injector 10 includes a nozzle valve control arrangement 38 which operates to initiate and variably control the movement of nozzle valve

element 20. An injection control valve 46 includes a control valve member 50 and an actuator 52 for selectively moving the control valve member 50 through a predetermined variable lift schedule to control the movement of nozzle valve element 20. The fuel injector 10 also includes a nozzle valve lift detecting device 60 for detecting the lift or extent of movement of the nozzle valve element 20 into the open position and for providing a nozzle valve element lift feedback signal. (See, cols. 4 and 5.)

When the nozzle valve element 20 impacts control valve member 50, a slight axial force is transmitted to piezoelectric actuator 52 causing compression of the piezoelectric elements and generation of voltage. As shown in FIG. 3, the increase in voltage due to the impact force of nozzle valve element 20 on control valve member 50 causes a "spike" in the voltage curve. The increase in voltage functions as a nozzle valve element lift feedback signal which is detected by control device 58. Control device 58 then processes and utilizes the nozzle valve element lift feedback signal to vary the timing of the injection control signal and/or the amount of voltage supplied to actuator 52 to thereby variably control the injection timing, fuel metering and/or injection rate shape. (See, col. 6, lines 5-20 and lines 57-65.)

Applicants also respectfully disagree with the Examiner's arguments concerning the features of claim 6. It is Applicants' opinion that Crofts does not show these same or similar five voltages. Applicants respectfully request the Examiner, if this rejection is to be maintained, to specifically direct Applicants' attention to such features in Crofts.

As thus seen, the Crofts fuel injector does not show an energizing device actuated by a fluid pressure acting on a feedback piston. Instead, Crofts uses the needle valve assembly.

Accordingly, Applicants respectfully request that the rejection over claims 1-10 be withdrawn.

**35 U.S.C. §103 Rejection**

Claim 13 was rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,740,782 to Lowi in view of U.S. Patent No. 5,042,445 to Peters. Claim 14 was rejected under 356 U.S.C. §103(a) over Lowi, Peters and Schneider. These rejections are respectfully traversed.

Claim 13 recites, in part:

an actuator having a fluid connection between ambient and the second hydraulic surface of the spool valve assembly, the actuator being sensitive to a spool valve opening via at least one of fluid pressure or mechanical pressure to provide a monitoring voltage

However, the combination of Lowi and Peters does not show these features.

In Lowi, the actuator does not provide a monitoring voltage. First, Figure 10, merely shows a metering pulse waveform produced in the open loop mode of operation. There is no indication that this is a monitoring voltage, as provided by the claimed invention. In fact, col. 14 discloses:

The microprocessor facilitates two modes of control of injector timing. Open-loop timing is calculated from a programmed schedule based on known engine characteristics (an engine map stored in memory) and instantaneous measurements of shaft speed and position. This mode of control occurs during rapid transients in engine operating conditions when the processing of injector piston position sensor information may lag changes indicated from faster engine map look-up.

It is thus also seen that the actuator is not sensitive to a spool valve opening via at least one of fluid pressure or mechanical pressure to provide a monitoring voltage. Instead, the voltage is provided by known engine characteristics (an engine map stored in memory) and instantaneous measurements of shaft speed and position.

Peters, on the other hand, is used for showing a valve assembly. Peters does not show the features missing in the Lowi reference.

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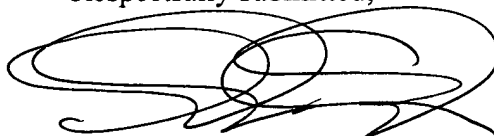
As to claim 14, this claim depends from a distinguishable base claims. For this reason, claim 14 is also distinguishable.

Accordingly, Applicants respectfully request that the rejections over claims 13 and 14 be withdrawn.

### CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 23-1951.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Andrew M. Calderon', with a large, stylized flourish at the end.

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